Indigenous Knowledge Practices in Soil Conservation at Konso People, South western Ethiopia

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Abstract

Indigenous knowledge in soil conservation practices is common in many indigenous peoples of the world. Thus, it is common to see different forms of soil conservation practices across the various indigenous societies and peoples of Africa where by Ethiopia is part and parcel. Among the many indigenous ethnic groups in Ethiopia having the best experience and worldly known knowledge of indigenous soil conservation is the one in the Konso people. It is known that Ethiopia is a nation regarded as the roof of Eastern African countries and there by water tower of the region. Hence the many areas of the country's top soil is under sever condition of erosion however the Konso people have a very deep indigenous soil conservation mechanisms which enable them to save the soil from erosion. The knowledge of the Konso people in soil conservation is exceptional and considered as the best experience in the world and registered in UNESCO. This study is about indigenous knowledge in soil conservation mechanisms at Konso people, South Western Ethiopia. Some of these knowledges are the culture of terracing, crop rotation, mulching, agro forestry and others. The main objective of the study is to explore the indigenous soil conservation mechanisms of the Konso people and to propose ways for maintaining this useful knowledge for sustainable environmental management. In this study, both primary and secondary data collection techniques were used. This includes interviews, focus group discussions, observations, document analysis and other data sources. The finding of the study shows that the indigenous soil conservation mechanisms in the community is developed over a very long period of time and basically tested its efficiency and become their survival strategies with change of climate. Moreover, the Konso people have a very deep indigenous knowledge on soil conservation mechanisms which are deeply embodied in their culture. The community justifies their knowledge by giving ritual meaning and as part of their lives. In contrast to this, lack of fully fledged security of land tenure by the government side remained as a challenge for the community. In fact, mechanisms should be sought either by governmental or nongovernmental organs for further development of this knowledge. Therefore, the indigenous soil conservation mechanisms of the Konso people provide an excellent base on which the government should design appropriate soil conservation mechanisms.

Key words: culture, indigenous knowledge, soil conservation mechanisms, UNESCO

1. Introduction

The top soil of Ethiopia is undergoing at a faster rate of erosion. The rate of soil loss for Ethiopia varies considerably from place to place.

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The densely settled areas of Northern Ethiopia are among those with the highest rate of soil loss since the environment is highly degraded as compared to the Southern part of the country. At present, the forest reserves of the country are estimated to be 2.5-3% of the total land, and about 100,000 hectares of forest are lost annually. About 1 billion tons of topsoil also believed to be eroded annually (Taddesse, 1995). In line with this, Zemenfes (1995) asserts that the average soil erosion is 42 tones/hectare/ year in the crop lands.

It is clear that soils with low fertility are unable to allow sufficient crop cover to sustain life. Erosion and low humus content of such soil decrease infiltration and moisture holding capacity of the soil. These all quest for the importance of soil conservation measures. Thus, it is increasingly recognized that adequate conservation of soil resources is a precondition for sustainable rural development strategies particularly in the highlands of Ethiopia (Ibid).

However, most of the projects for soil conservation planned at the center and implemented at the local level show little attention to the question of whether the local population could apply to techniques on their own farm fields. Similar with the above experience at the end of project farmers did not have interest to expand new techniques to the rest farm fields. This is partially attributed to the costly nature and problem of adaptability of the new technology otherwise not contextualize. Furthermore, planners in the field assume that it is the responsibility of the local population for the overall maintenance of the structures built by a project.

The scientific organized knowledge of soil conservation has also conventionally regarded the knowledge of soil conservation of local people as 'pre-logical' or 'irrational', and in doing so have either dismissed or greatly played down its validity (Howes, 1979).

However, the age-old indigenous soil conservation process developed from empirical knowledge and experience of the individual elements of soil, of the relations through which these elements are smoothly run and of the way in which these relations change through short and most extensive periods of time (Ibid).

In order to create balance, experts on the indigenous soil conservation knowledge stated that indigenous soil conservation like scientific soil conservation should become possible as a result of a more general intellectual processes of creating order out of disorder not simply as a response to practical human needs. In fact, there is clear boundary between indigenous and scientific soil conservation mechanisms in which indigenous soil conservation is more of general and relies almost exclusively on perception and experience whereas scientific once characterized by a greater ability to break data presented to the senses and reassemble it in different ways(Ibid).

As a result, the following study exemplifies the widespread nature and degree of sophistication of indigenous soil conservation mechanisms. Thus, indigenous knowledge on soil conservation at Konso people South West Ethiopia will provide a more detailed account, description and analysis of indigenous soil conservation. The study also serves to illustrate and reinforce the value of indigenous soil conservation as the basis for improved conservation of soil resources.

2. A Short Background on the Konso Woreda

The administrative unit of the study area is located in the Southern Nations, Nationalities, and Peoples Region (SNNPR) of Ethiopia. Konso is located in, not any of the zones, SNNPR, and it is considered as a special woreda, an administrative subdivision which is similar to an autonomous area. This special woreda (district) named after the dominant people in the area Konso. Geographically, Konso located in South West part of the country and within the circle of rift valley.

Because of the frequent violent conditions with their neighbors (Borena, Guji, Tsemai, and Derashe people), they were forced to live in a restricted mountain area. Moreover, fear of insect born diseases in the lowlands like malaria, tsetse fly and other insect bites restricted the Konso people in hill tops (Watson, 2009).

The woreda has shared common boundary with Oromia region in the South , Weyito River in the West which separates it from the Debub Omo Zone, the Dirashe special woreda in the North, Amaro special woreda in the Northeast , and Burji special woreda in the East. The administrative center is Karati; other towns in Konso include Fasha and Sagan (Source: Konso woreda agricultural office).

Konso woreda comprises two major agro climate zones, the dry land with semi arid climatic conditions supporting the majority of the population (between 60-70 percent); and agricultural uplands in the middle altitude supporting the rest of the primarily cultivating population. Based on the Konso woreda agricultural office information, the main agro ecological divisions of Konso , i.e. 70% accounts arid (Kola) and 30% account tropical sub-humid (weinadega). The soil of the area varies from place to place. The Konso woreda agricultural office studied and estimated that, 35% of the soil is sandy, 30% is clay and the rest, 35% is loamy soil.

The native Konso indigenous practice is a distinct and sustainable form of agriculture that involves the building and maintaining of stone terraces, and fertilizing the fields with manure. A central feature of their fields is the endemic tree crop, *Moringa stenopetala*. The main crop is sorghum, along with some tuber and root crops are (yam, cassava, sweet potato and taro) and cotton. Indigenous techniques of soil conservation identified in the woreda (district) are varied and at times demonstrated considerably sophisticated.

3. Objectives of the Study

The objective of the study is to explore the indigenous soil conservation mechanisms of the Konso people and to propose ways for maintaining this useful knowledge for sustainable environmental management.

4. Methodology

In this study, both the primary and the secondary data collection techniques were used. This includes observations, interviews, focus group discussions, document analysis and other data sources. The applicability of some of these instruments is highlighted below:-

- **Observations**

Personal observations were conducted together with taking field notes on the behaviors and activities of individual farmers on their interest for the application of different indigenous soil conservation mechanisms and it is associated factors. These observed facts have further investigated and consolidated through interview and focus group discussions.

- **Interviews**

In this research many interviews were carried out with the intention of collecting the maximum data until saturation reaches. The researcher conducted face-to-face interviews with farmers, experts in the field, woreda agricultural officers on the issue of indigenous soil conservation mechanisms and its effectiveness. In this interview, different sections of a society were put in to account. Some to mention were farmers and their families (men, women, sons and daughters) and others.

- **Focus Group Discussions (FGDs)**

Focus group discussions with six to eight discussants in each group were carried out on different issues of indigenous soil conservation mechanisms of the local people. These discussions were involved unstructured and generally open-ended issues of indigenous and modern soil conservation mechanisms that are intended to elicit views and opinions from the participants.

- **Document Review and Analysis**

During the process of research, I reviewed related literature on indigenous soil conservation mechanisms of the different parts of the world and general back ground of the Konso people. These documents were reviewed both from government (e.g., constitutions of the governments, newspapers and official reports) and private documents (e.g., personal articles, diaries and letters). Accordingly, data analysis carried out through interpretation, summarization and description of meanings, views and perceptions of the community. All these things conducted after the data collection was made.

5. Results of the Finding

5.1 Farmers Indigenous Knowledge on Soil Conservation Mechanisms

From the finding, some of the most important indigenous soil conservation mechanisms of the Konso farmers are the following:

A. Terracing. The Konso Cultural Landscape is characterized by extensive dry stone terraces which witnesses hundreds of years of persistent human struggle to harness the hard, dry and rocky environment, which has resulted in the beautifully outlined rows of dry stone terrace. The terraces retain the soil from erosion, collect maximum water and discharge the excess, and create terrace saddles that are used for agriculture. The terraces are the main features of the Konso landscape and the hills are contoured by the dry stone terraces that could reach at some places up to 5 meter high. The dry stone walled towns (Paleta) of the Konso are located on high hills selected for their strategic and defensive advantage. These towns are circled by, between one and six rounds of dry stone defensive walls, built using locally available rock.

B. Contour Ploughing- In several cases, farmers applied different methods of soil conservation. Cultivating crops on the contour where the slope was steep is one of them. Most of the farmers, as I observed, used contour ploughing in order to minimize runoff and erosion.

C. Crop Rotation- the use of crop rotation is another widespread phenomena in the area where maize, ground nut and sorghum grown rotationally. Crop rotation is used by the farmers important for different reasons including soil fertility, thereby improved crop yield. The farmers of the area know that as of the scientific method improved soil fertility can be achieved by alternating high residue producing crops with the growing low residue producing crops.

D. Fallowing- Fallowing is applied with a very limited extent since land scarcity is stated to be a major constraints to production in the area. This partially aggravated by the topography of the area. Thus, it seems likely that the extent of fallowing and limited periods involved is a consequence of the agricultural land in the finding.

E. Mixed Cropping- mixed cropping is widely practiced in the area. Farmers used to inter planting two or more crops together with some root edible plants. The great majority of the cases are a mix of maize and groundnuts. Mixed cropping in the area helped the potential to reduce erosion by having a crop on the land for a longer period of the year. Also, it served for them to cultivate different crops at one time on a single farm land. However, the crops in the area are widely similar growing seasons and thus the potential for this benefit is not as such. Nevertheless, the inclusion of leguminous plant may improve its nitrogen fixation process for cereal crops.

This shows that most of the farmers have an awareness of the potential for maintaining soil fertility and how to be cost effective by using their indigenous knowledge of mixed cropping.

F. **Surface Mulching-** Most farmers is using surface mulches on their fields, thus providing a protective cover at a time when crop cover is not present. Some farmers left crop residue while others used by branches. The benefit of protective covering was widely appreciated, as was the improved infiltration rate afforded by the techniques and reduced evaporation rate. Further stated objective is the addition of nutrients to the soil through the decomposition of the organic matter. However, the density of mulch viewed in many fields was below the level required to be most effective as protective cover since the use of residence as animal food was witnessed in many households of the area.

G. **Fertilization-** Fertilization is the other widely practiced activity of indigenous soil conservation mechanism in the area. This is because the area is known in having continuous cropping activity. Thus, farmers used it to retain the fertility of the soil. This importance is reflected in the very high frequency with which both inorganic and organic fertilizer used to apply in this area. But according to informants the most widely used forms of fertilizers are manure, house hold garbage and humus because of lack of capacity to buy modern fertilizer and fear of long term consequence of modern fertilizers in the land by most farmers. This also shows that farmers have highly inclined to use their own indigenous fertility maintaining mechanisms than the modern one.

H. **Agro Forestry-** the use of agro forestry for soil conservation is the most widely practiced activity in the area. It is very common to see different types of small and big trees inside and just outside the farm land of Konso. The best example is *Moringa stenopetala* (locally also called to be Moringa) which has several purposes; used for shade, it has a very high nutrition quality. Moringa leaves serve as their main diet and is used as a medicine for various diseases. Other tree species in Konso are: *Juniperus procera, Euphorbia spp Terminalia browenii, Olea africana, Ficus sori, Cordia africana, Sterculia africana, Accia abysinica*. Among these, *Juniperus procera* has a high significance in Konso's rituals. At usual, these trees are naturally occurring once. In fact, the protection of these big trees in the area is also for ritual practices and shading services for some sort of meeting to the local community. Thus, it seems that in addition to trees role for indigenous soil conservation practices in agro forestry form, it has strong attachment the society cultural practices.

I. **Field Boundaries**- It is also common to see ridge covered with grasses between plots of farm land. The dividing line, boundary, and the land before and after the ridge is the property of two different individuals. This structure is important for soil conservation which can reduce the intensity of erosion in the farm fields. But the uses of this structure are not noticed by most farmers.

In short, all the above indigenous soil conservation mechanisms, gained through experience by the local community, are the basis for self sufficiency and self determination and effective alternatives.

5.2 Farmers Knowledge of Soil Problems

Throughout the discussion farmers knowledge of soil problems refers to the awareness to relationship and processes of soil erosion, and fertility of the soil. Farmers have showed fertile and softer soils which are high prone to erosion than infertile and harder soil. The farmers perceived that fertile soil held more erodible character than infertile due to soil texture and particles size. This knowledge of the farmers is most closely associated with the scientific finding.

This is because the farmers have a good knowledge about the causes for the year to year decrease in the productivity of the land and the steep slope by far exposed to erosion than the genteel one.

Moreover, farmers have a good knowledge about which crop, plant and vegetation could retain the soil fertility of the area. Accordingly, as indicated above, the farmers have good experience and knowledge that leguminous plants such as beans, peas and chickpeas are good capacity in maintaining and retaining the soil fertility of the land.

In addition to the above, farmers of Konso have a higher degree of perception and knowledge about soil erosion processes and problems. Most farmers believed in rain drops impact on bare and steep gradient soils as the main causes for soil loss from their farm (Forch, 2003). Similar with this, the knowledge of soil problems influenced by severity of erosion, size of the farm and farm experience in the study area. The positive relationship between severity of erosion and farmers perception of soil erosion problems is the fact that farmers who cultivate eroded land perceive the associated problems more than those who cultivate farms with deeper top soils. Farmers related the declining trend of soil productivity as the direct implication for the extent of erosion in the area. This resulted in most farmers who settled at the steeper parts of the slope have showed a great tendency to migrate to the town for the purpose of searching job because of reduction in land productivity capacity.

Farmers' perception of soil erosion problems increased with decreasing the size of the farmland, i.e., inversely related. This is because over cultivation, the absence of fallowing system and the reliance on subsistence agricultural production system make farmers become more aware of problems associated with soil erosion in small size of the farm land than the farmers owning the larger size of farms.

Farming experience of the farmers also played an important role in the farmers' perception of soil erosion problems. A wider time of experience as gained through living as a farmer in the locality helped farmers to perceive the processes and effects of soil erosion happening at the localities than short lived experience of farmers. This also vividly demonstrated that Derg regime settled farmers land was highly exposed to erosion than the long lived indigenous farmers land in the area whom developed different forms of indigenous adaptable strategies.

5.3 Attitude of Farmers towards Soil Conservation

Most farmers are ready to maintain the fertility of the soil. But some of them located in geographically flat land area due to fear for future confiscation of their land by government bodies or any private firms not interested to maintain the fertility of the soil. Therefore, the later groups of farmers are highly relied on the mechanism by which the land will be over utilized. This is particularly a great tension for the farmers very nearby to the towns of Karati, Fasha and Sagan. These towns are fast growing ones in which the pervious farm land becomes part and parcel of their town part. Thus, the lower income status and insecure land policy system of the government may dictate them with birth and growth of such attitude.

In contrast to the above, the majority of informants have a good knowledge of the possibility of increasing the productivity of their farm land based on giving due care to the soil even though they have great doubt that soil management and afforestation are implemented for the benefit of the government.

The farmers are also suspicious about what 'preached' by agents of planting tree seedling on their already small sized farm plots. As a result, farmers are used to cutting down trees imposingly planted by the government on their pasture land while giving due care to trees increasingly grown by themselves. This shows that the farmers of the area are against the dense trees. The reason they forwarded include wild animals will use dense trees for hiding and dwelling place for attack on farm fields and ; thus, they support the growing of trees along valleys and on unproductive barrier and steeper lands.

For instance, the recently established Melese Zenawi park in the steeper part just immediately to the town of Karati is one to be mentioned which is carrying out by the agreement of both the government and the local people.

In fact, according to informants, the attitude of farmers towards soil conservation measures necessarily determined by the socio-economic acceptability and its sustainability implications. Most of the farmers have shown a sign of voluntariness to implement the recently introduced ideas for soil conservation measures as long as these measures are designed prior assessments on their socio economic and cultural demand. Conserving soils of their small sized farms is deeply rooted in the culture of the community in spite of the fact that the nature of the terrains, propensity to erosion hazards and shrinkage of the farm plots which feeds one of the most densely settled rural population in the country.

A part from the above, farmers who own farms planted with cash crops such as stimulant crops 'coffee (Coffee arabica), 'Chat', tobacco , Citrus plantations and different fruits are inclined to take care of fertility of their soils than farmers with lesser proportion of land under cash crops.

According to Central Statistical Agency (CSA, 2007), five tons of coffee were produced in this woreda in the year ending in 2007, based on inspection records from the Ethiopian Coffee and Tea authority. Farmer's great interest in soil conservation measure for the cash crops is the fact that they expect to increase their farm income. Such diversified productivity has enabled the Konso people to combat climate vulnerability. Moreover, it is true that farmers with higher income invest more time, capital and labor to be used for soil conservation measure purpose, there by indirectly sustainable soil conservation will be achieved.

In short, farmer's attitudes towards soil conservation measures vary considerably and correspondingly with their attitude towards control over nature, their knowledge about processes of soil erosion and consequent problems; and share of farm allotted to cash crops. Farmers with firm conviction about increasing or keeping the productivity of that farmland by their own have a better inclination towards soil conservation than those who believed in waiting solution from: "supernatural beings."

6. Conclusion

Based on the above findings, the following conclusions could be drawn:

Throughout the discussion, the emphasis is on the necessity for development planners to take into account the accumulated knowledge and indigenous skills and technology of the people among whom they work.

As the preceding discussion of soil conservation of the study area shows ,many technological solutions such as chemical fertilizer that have been proposed have failed because they have not taken into account the local culture, and conditions particularly society's preferences, skills , knowledge and economic back ground. Therefore, the indigenous soil conservation systems provide an excellent base on which appropriate soil conservation is practiced.

It can thus be concluded that farmers are well aware of the problems of soil erosion. Hence, their lack of interest to participate in soil conservation cannot be explained by lack of awareness about the problem since insecure land tenure is the most important factor for them to be unable to conserve the soil. This is also because land has been under state control since 1975 Land Reform Proclamation of the Derg. This uncertainty and feeling of insecurity might discourage the land users from making any investment on lands they cultivate today for long term benefits. This implies that private ownership of land will be an incentive towards sustainable use of soil.

However, it may not be true to think that private ownership will be a fair guarantee of circumvention of all the problems of resource degradation since it also associated with backward farming practices and inappropriateness of the techniques provided. In short, this collection helped to identify the richness, variety, and value of indigenous knowledge.

7. Recommendations

Based on the above findings and conclusions, the following measures are recommended for policy implementers:-

- Discouraging the ‘‘top down approach’’. In other words, the policy usually designed at the central government level and applied to the local level with little or no consideration of their socio-economic practices will lead to unsuccessful attempts of a program in general and soil conservation measures in particular.
- Giving great attention to the socio-cultural institutions which are silently governing the local people practice on their environment than imposing new ideas for local solutions.
- Encouraging farmers’ confidence on the government’s agricultural land policy. Such as deep felt security of land which belongs solely to a farmer, ownership of his/her own trees … etc.
- Understanding the socio-cultural acceptability or feasibility of conservation measures before encouraging its implementations.
- Integrating soil conservation measures of the local people with the currently working farming system. That can improve the indigenous knowledge system of soil conservation and the possibility of integration between indigenous knowledge systems with some modern/scientific/ knowledge rather than totally forget the indigenous knowledge of the farmer. This is because building upon indigenous knowledge system will boast farmers’ self-reliance and felling of empowerment as determinants of their own course towards an improved livelihood and sustainable land use.
- The role of the media should also be changed. Encouraging the way how enhancing the indigenous knowledge either by improving or mixed with some other borrowed technologies. Moreover, to overcome the problem of holistic view of local-level conditions , the following measures can be done:

    - Rural exposure for extension and research staff: extension and research staff should be exposed the relations to which their work relates.
    - Checklist/wider assessment- check list/ wider assessment will be used to draw attention on which issue of the farmers is more priority than the others in determining soil factors.
    - Experimental work in rural condition. The process may take a full blown experimental work on farmers’ field and with their collaboration. In general, people are more likely to operate and exploit a new technology successfully if they involve actively.

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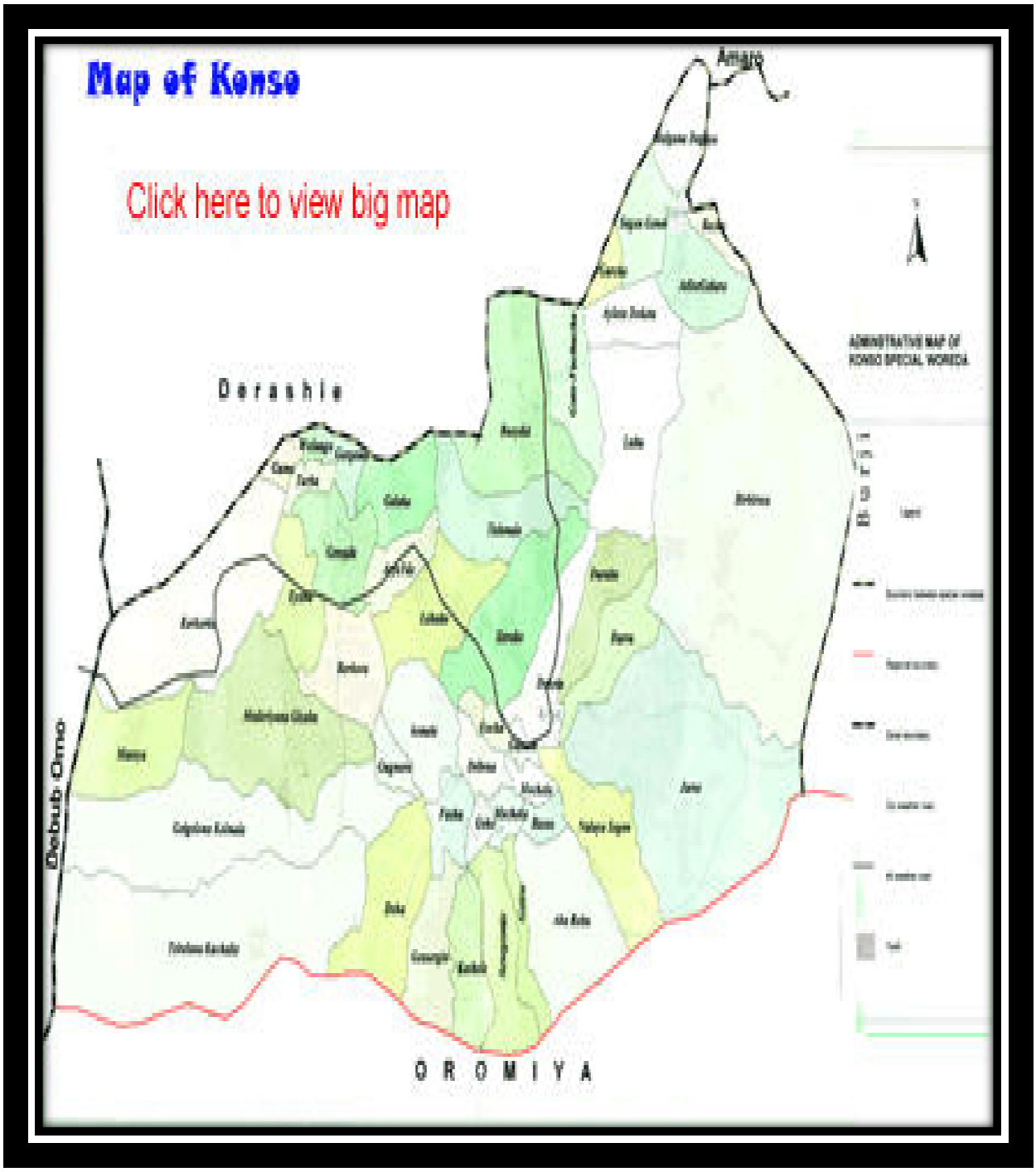
Fig1: Map of Konso woreda and its adjacent areas



Source: Konso special woreda (district) agricultural and rural development office.